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Research Article

Two new species of the subgenus *Indoribates* (*Haplozetes*) (Acari, Oribatida, Haplozetidae) from Tajikistan

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Abstract

Two new species of oribatid mites of the subgenus *Indoribates* (*Haplozetes*) (Oribatida, Haplozetidae) are described based on adult specimens from Tajikistan. *Indoribates* (*Haplozetes*) *tajikistanensis* **sp. nov.** differs from *I.* (*H.*) *vindobonensis* by the position of the adanal lyrifissure and the shape of the saccule *S2*. *Indoribates* (*Haplozetes*) *asetosus* **sp. nov.** differs from *I.* (*H.*) *fusifer* (Berlese, 1908) by the absence of φ on tibia IV and the shape of epimeral setae and adanal setae $ad_{1\text{-}2}$; from *I.* (*H.*) *triungulatus* (Beck, 1964) it differs by the length of the interlamellar seta, adanal setae $ad_{1\text{-}2}$ and tutorium, and the shape of notogastral seta. The genus *Indoribates* is recorded in Tajikistan for the first time.

Key words: Morphology, new species, new record, oribatid mites, taxonomy

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Introduction

The genus *Indoribates* was proposed by Jacot (1929) with *Protoribates punctulatus* Sellnick, 1925 as the type species. The main generic characters of this genus were summarized by Jacot (1929), Hammer (1979: as for *Sundazetes* Hammer, 1979), Mahunka (1977: as for *Nixozetes* Mahunka, 1977; 1997: as for *Bolkiah* Mahunka, 1997), Balogh and Balogh (1992) and Subías and Shtanchaeva (2023). At present, Subías's world catalogue of oribatid mite records that the genus *Indoribates* includes five subgenera: the nominate subgenus; *Bihaplozetes* Subías, 2020; *Haplozetes* Willmann, 1935; *Mancoribates* Hammer, 1961, and *Neoindoribates* Subías, 2020 (Subías 2022, 2024 updated). Some authors support the independence of some genera (e.g. *Indoribates*, *Haplozetes*, *Mancoribates*; see Weigmann 2006; Ermilov and Behan-Pelletier 2024; Ermilov et al. 2024; Norton and Ermilov 2024), but we follow the world catalogue of Subías. Xu et al. (2024) proposed that *Bihaplozetes* is a junior synonym of the subgenus *Indoribates* to avoid identification confusion. The subgenus *Indoribates* (*Haplozetes*) includes 16 species and one subspecies, which have a nearly cosmopolitan distribution (except Antarctica) (Subías 2022, 2024 updated).

The first data on oribatid mite fauna (Acari, Oribatida) of Tajikistan were presented by Bulanova-Zachvatkina (1960a, 1960b). Subsequent studies

of oribatids in Tajikistan during the next 64 years were fragmentary but include the works of Ilyasov (1963, 1970), Krivolutsky (1966, 1971), Khristov (1973), Sitnikova (1973), Ghilarov and Krivolutsky (1975), Gordeeva (1980), Karppinen et al. (1986), Ryabinin (1986), Shtanchaeva (2001), Penttinen and Gordeeva (2009), Niedbała (2012), Sidorchuk and Norton (2016), and Wei and Chen (2017).

During taxonomic survey of oribatid mites (Acari, Oribatida) collected from litter and upper soil stratum in Tajikistan, we found two new species of the subgenus *Indoribates* (*Haplozetes*), *I.* (*H.*) *tajikistanensis* sp. nov. and *I.* (*H.*) *asetosus* sp. nov. The main goal of this paper is to describe and illustrate these new species. Before the present study, the genus *Indoribates* had not been reported from Tajikistan.

Methods

Specimens were temporarily mounted in lactic acid on cavity slides for measurement and illustration. All specimens were examined under a differential interference contrast microscope (Leica DM 2500). Drawings were made with a camera lucida using a Leica transmission light microscope (Leica DM 2500). All specimens were stored in test tubes filled with 75% ethanol solution and deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing (**IZAS**).

Body length was measured in lateral (temporary cavity slides) or dorsal (permanent slides) view, from the tip of the rostrum to the posterior edge of the notogaster. Notogastral width refers to the maximum width of the notogaster in dorsal view (behind pteromorphs). Lengths of body setae were measured in lateral aspect. All body measurements are presented in micrometers (μm). Formulas for leg setation are given in parentheses according to the sequence trochanter-femur-genu-tibia-tarsus (famulus included). Formulas for leg solenidia are given in square brackets according to the sequence genu-tibia-tarsus.

Morphological terminology used in this paper mostly follows that of papers on *Haplozetes* (Grandjean 1936), and Norton (1977) for leg setal nomenclature. See Norton and Behan-Pelletier (2009) for an overview.

The following abbreviations are used: *lam* = lamella; *slam* = sublamella; *tu* = tutorium; *ro*, *le*, *in*, *bs*, *ex* = rostral, lamellar, interlamellar, bothridial and exobothridial setae, respectively; *Al* = sublamellar porose area; *D* = dorsophragma; *P* = pleurophragma; *c*, *la*, *lm*, *lp*, *h*, *p* = notogastral setae; *Sa*, *S1*, *S2*, *S3* = notogastral saccules; *ia*, *im*, *ip*, *ih*, *ips* = notogastral lyrifissures; *Ad* = sejugal porose area; *gla* = opisthonotal gland opening; *a*, *m*, *h* = subcapitular setae; *or* = adoral seta; *sup*, *inf*, *v*, *l*, *d*, *cm*, *acm*, *ul*, *su*, *vt*, *lt* = palp setae; ω = palp solenidion; *cha*, *chb* = cheliceral setae; *Tg* = Trägårdh's organ; *Pd I*, *Pd II* = pedotecta I, II, respectively; *1a*, *1b*, *1c*, *2a*, *3a*, *3b*, *3c*, *4a*, *4b*, *4c* = epimeral setae; *dis* = discidium; *cp* = circumpedal carina; *g*, *ag*, *an*, *ad* = genital, aggenital, anal and adanal setae, respectively; *iad* = adanal lyrifissure; *Amar* = marginal porose area; *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = trochanter, femur, genu, tibia, and tarsus, respectively; ω, σ, φ = leg solenidia; ε = leg famulus; *v*, *ev*, *bv*, *l*, *d*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl* = leg setae; *pa* = porose area.

Descriptions

***Indoribates* (*Haplozetes*) *tajikistanensis* sp. nov.**
https://zoobank.org/49B9B555-B32A-4EFA-90F8-9B4F24CB655B
Figs 1, 2
Common name. 塔吉克单翼甲螨

Type material. ***Holotype*** • (female CJ-16-036): Tajikistan, Sughd Region, Ghonchi District, Zarnisor Village; 39°55'27"N, 69°08'42"E; 1055 m; moss, grass, and soil; 21 May 2016; Jun Chen leg. ***Paratypes*** • (three females, two males, CJ-16-037): same data as for holotype.

Diagnosis. Body size: 400–471 × 257–298. Rostrum rounded. Rostral, lamellar and interlamellar setae long, setiform, barbed; *le>in>ro*. Bothridial seta fusiform, with short stalk and slightly longer, barbed head. Tutorium long, with tooth distally. Notogastral setae short, setiform thin, slightly barbed. Four pairs of notogastral saccules with small opening; *Sa* channel elongate, other channels drop-like. All epimeral setae setiform, barbed. Genital and aggenital setae slightly barbed. Both anal setae and adanal setae $ad_{1\text{-}2}$ roughened. Adanal lyrifissure immediately to anterolateral margin of anal opening.

Description. ***Measurements*.** Body length 450 (holotype, female), 430–471 (five paratypes: two males, three females); body width 277 (holotype), 257–298 (five paratypes).

***Integument*.** Body brown. Surface densely microfoveolate (visible only under high magnification in dissected specimens; × 1000); podosomal region and lateral part of prodorsum partially with dense microgranulate cerotegument.

Prodorsum (Fig. 1A, C). Rostrum rounded. Tutorium long, with tooth distally. Lamellae long, located dorsolaterally. Sublamella short. Sublamellar porose area (7) oval. Rostral (57–67), lamellar (73–80) and interlamellar (65–75) setae setiform, barbed. Bothridial seta (49–55) fusiform, with short stalk and slightly longer, barbed head. Exobothridial seta (9) setiform short, roughened. Sejugal porose area diffuse, located posterolateral to interlamellar seta, transversely elongate.

Notogaster (Fig. 1A, C). Anterior notogastral margin convex medially. Dorsophragma elongate. Pteromorph with distinct hinge. Ten pairs of notogastral setae (15–33) setiform, slightly barbed (visible under high magnification). Four pairs of saccules with small opening, *Sa* channel elongate, others channels drop-like. Opisthonotal gland opening and all lyrifissures clearly distinct.

Gnathosoma (Fig. 2E–G). Subcapitulum size: 88–93 × 69–73. Subcapitular setae setiform; *m* (15–17) longer than *a* (13–15) and *h* (12–13); *a* and *m* barbed, *h* smooth. Both adoral setae (7–10) setiform, roughened. Palp (length 59–65) with setation 0-2-1-3-9(+ω). Postpalpal seta (5) spiniform, roughened. Chelicera (length 105–112) with two setiform, barbed setae (*cha*: 34–36; *chb*: 21–23).

Epimeral and lateral podosomal regions (Fig. 1B, C). Epimeral setal formula: 3-1-3-3. All epimeral setae (11–19) setiform, barbed. Pedotectum II trapezoid, rounded apically. Discidium triangular, rounded apically. Circumpedal carina long, reaching to acetabulum II.

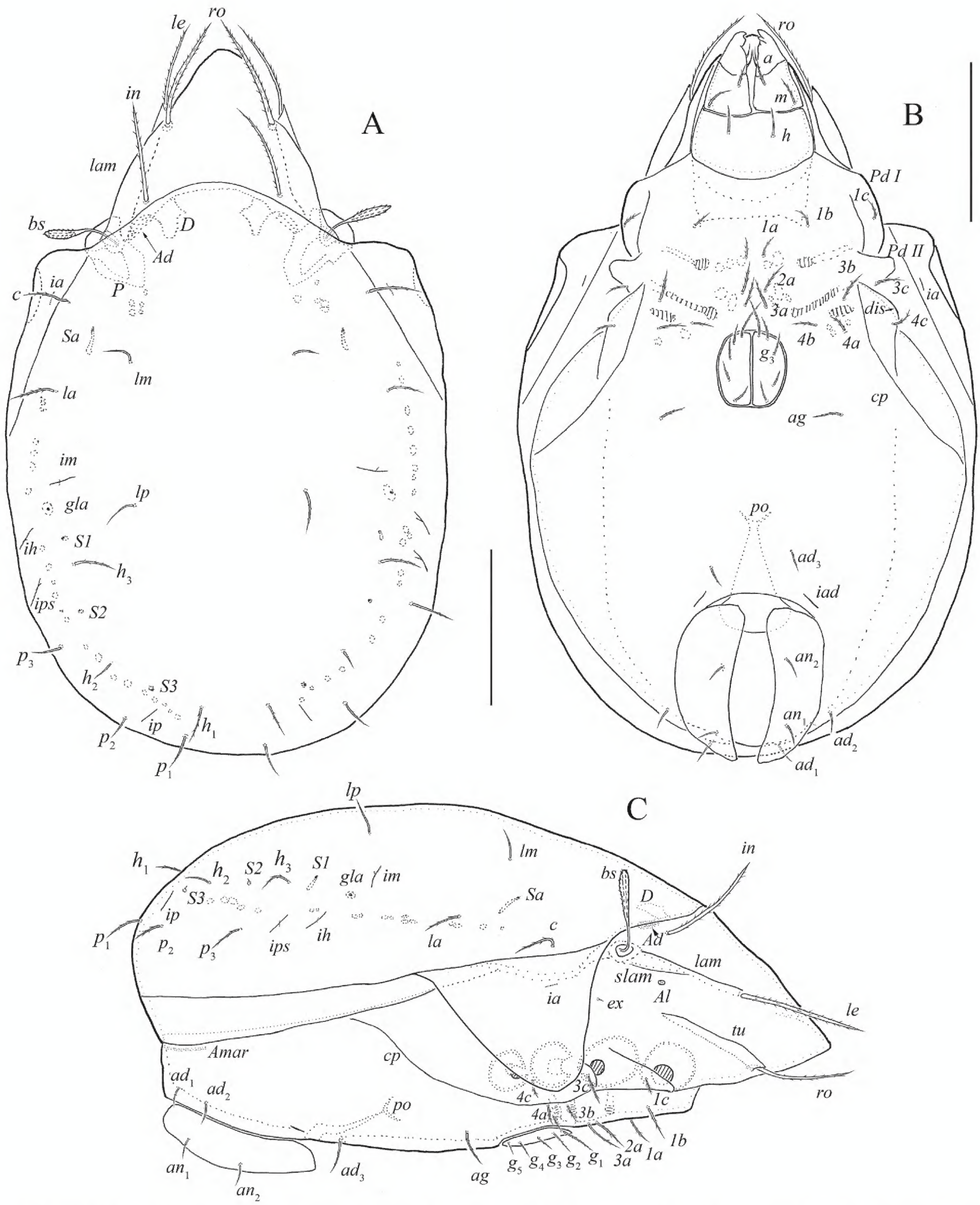

Figure 1. *Indoribates* (*Haplozetes*) *tajikistanensis* sp. nov. **A** dorsal view (legs not shown) **B** ventral view (gnathosoma and legs not shown) **C** lateral view (gnathosoma and legs not shown). Scale bar: 100 μm.

Anogenital region (Fig. 1B, C). Genital (g_1 23, g_2-g_5 17–11), aggenital (14–16) setae and adanal seta ad_3 setiform, slightly barbed. Both anal setae (9–11) and adanal setae ad_1, ad_2 (11–13) setiform, roughened. Adanal lyrifissure close and anterolateral to anal plate.

Legs (Fig. 2A–D). All legs tridactylous; median claw thick, lateral claws thin; all claws slightly barbed on dorsal side. Dorsoparaxial porose area on femora

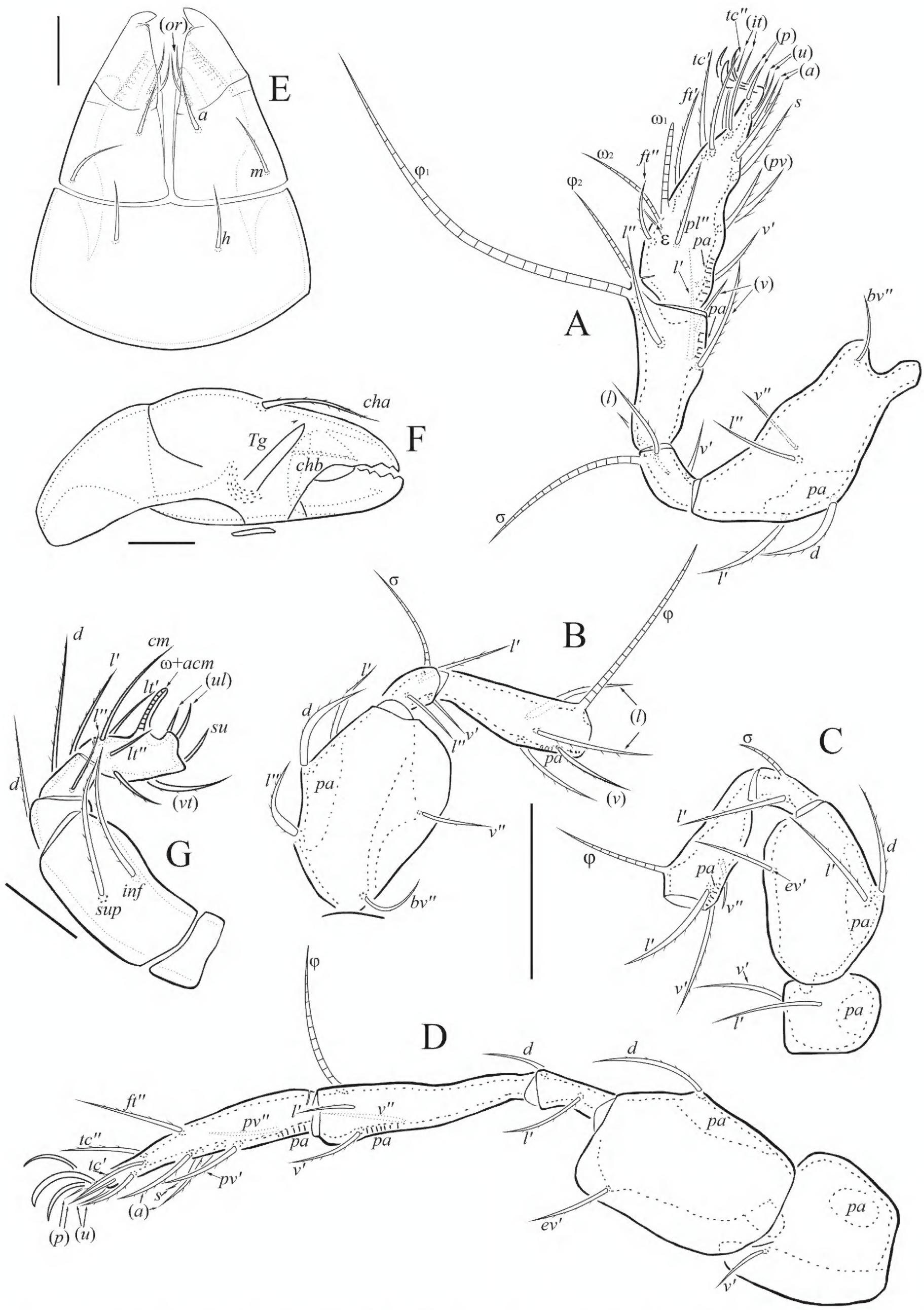

Figure 2. *Indoribates* (*Haplozetes*) *tajikistanensis* sp. nov. **A** leg I (without trochanter), right, antiaxial view **B** leg II (without trochanter and tarsi), right, antiaxial view **C** leg III (without tarsi), right, antiaxial view **D** leg IV, right, antiaxial view **E** subcapitulum, ventral view **F** chelicera, left, paraxial view **G** palp, right, antiaxial view. Scale bars: 50 μm (**A–E**); 20 μm (**E–G**).

Table 1. Leg setation and solenidia of adult *Indoribates* (*Haplozetes*) *tajikistanensis* sp. nov.

leg	Tr	Fe	Ge	Ti	Ta
I	*v'*	*d*, (*l*), *bv"*, *v"*	(*l*), *v'*, σ	(*l*), (*v*), φ_1, φ_2	(*ft*), (*tc*), (*it*), (*p*), (*u*), (*a*), *s*, (*pv*), *pl"*, *v'*, ε, ω_1, ω_2
II	*v'*	*d*, (*l*), *bv"*, *v"*	(*l*), *v'*, σ	(*l*), (*v*), φ	(*ft*), (*tc*), (*it*), (*p*), (*u*), (*a*), *s*, (*pv*), ω_1, ω_2
III	*l'*, *v'*	*d*, *l'*, *ev'*	*l'*, σ	*l'*, (*v*), φ	(*ft*), (*tc*), (*it*), (*p*), (*u*), (*a*), *s*, (*pv*)
IV	*v'*	*d*, *ev'*	*d*, *l'*	*l'*, (*v*), φ	*ft"*, (*tc*), (*p*), (*u*), (*a*), *s*, (*pv*)

Note. Roman letters refer to normal setae, Greek letters to solenidia (except ε = famulus). Single prime (') marks setae on the anterior and double prime (") seta on the posterior side of a given leg segment. Parentheses refer to a pair of setae.

I–IV and on trochanters III, IV well visible. Formulas of leg setation and solenidia: I (1-5-3-4-18) [1-2-2], II (1-5-3-4-15) [1-1-2], III (2-3-1-3-15) [1-1-0], IV (1-2-2-3-12) [0-1-0]. Homology of setae and solenidia indicated in Table 1.

Etymology. The specific name *tajikistanensis* refers to the country encompassing the type locality of this new species.

Remarks. *Indoribates* (*Haplozetes*) *tajikistanensis* sp. nov. is morphologically similar to *I.* (*H.*) *vindobonensis* (Willmann, 1935) (see also Grandjean 1936; Beck 1964; Kunst 1977; Mahunka 1982, 2001) from the Palaearctic, Ethiopian, Neotropical, and Oriental regions in having fusiform bothridial setae. However, the new species differs from *I.* (*H.*) *vindobonensis* by the position of the adanal lyrifissure *iad* (anterolateral margin of anal opening vs close and parallel to lateral margin of anal opening) and the shape of the saccule *S2* (with not bilobed channel vs with bilobed channel).

***Indoribates* (*Haplozetes*) *asetosus* sp. nov.**

https://zoobank.org/2033FE1A-4CC5-4C8B-BC4D-C4A46527CE4A

Figs 3, 4

Common name. 无毛单翼甲螨

Type material. ***Holotype*** • (female CJ-14-064): Tajikistan, Tavildara District, Hoja Pulod Village, 38°43'28"N, 70°27'14"E, 1730 m, grass and soil, 14 July 2014, Jun Chen leg. ***Paratypes*** • (one female, one male, CJ-14-064): same data as for holotype.

Diagnosis. Body size: 620–740 × 414–480. Rostrum rounded. Rostral, lamellar and interlamellar setae long, setiform, barbed; *le*>*in*>*ro*. Bothridial seta long, with shorter stalk and longer, uniformly thickened, barbed head. Tutorium short, simple. Ten pairs of notogastral setae represented by alveoli. All epimeral setae setiform, slightly thickened, barbed. Genital, aggenital, anal and adanal setae setiform, barbed; adanal setae ad_1 and ad_2 long, thickened, inserted on semicircular protrusion. Solenidion φ on tibia IV absent, but seta *d* developed instead it.

Description. ***Measurements.*** Body length 682 (holotype, female), 620–740 (two paratypes: one male, one female); body width 420 (holotype), 414–480 (two paratypes).

Integument. Body light brown. Surface densely microfoveolate (visible only under high magnification in dissected specimens; × 1000); podosomal region and lateral part of prodorsum partially with dense, microgranulate cerotegument.

Prodorsum (Fig. 3A, C). Rostrum rounded. Tutorium short, simple. Lamella about 1/2 length of prodorsum. Sublamella visible. Sublamellar porose area

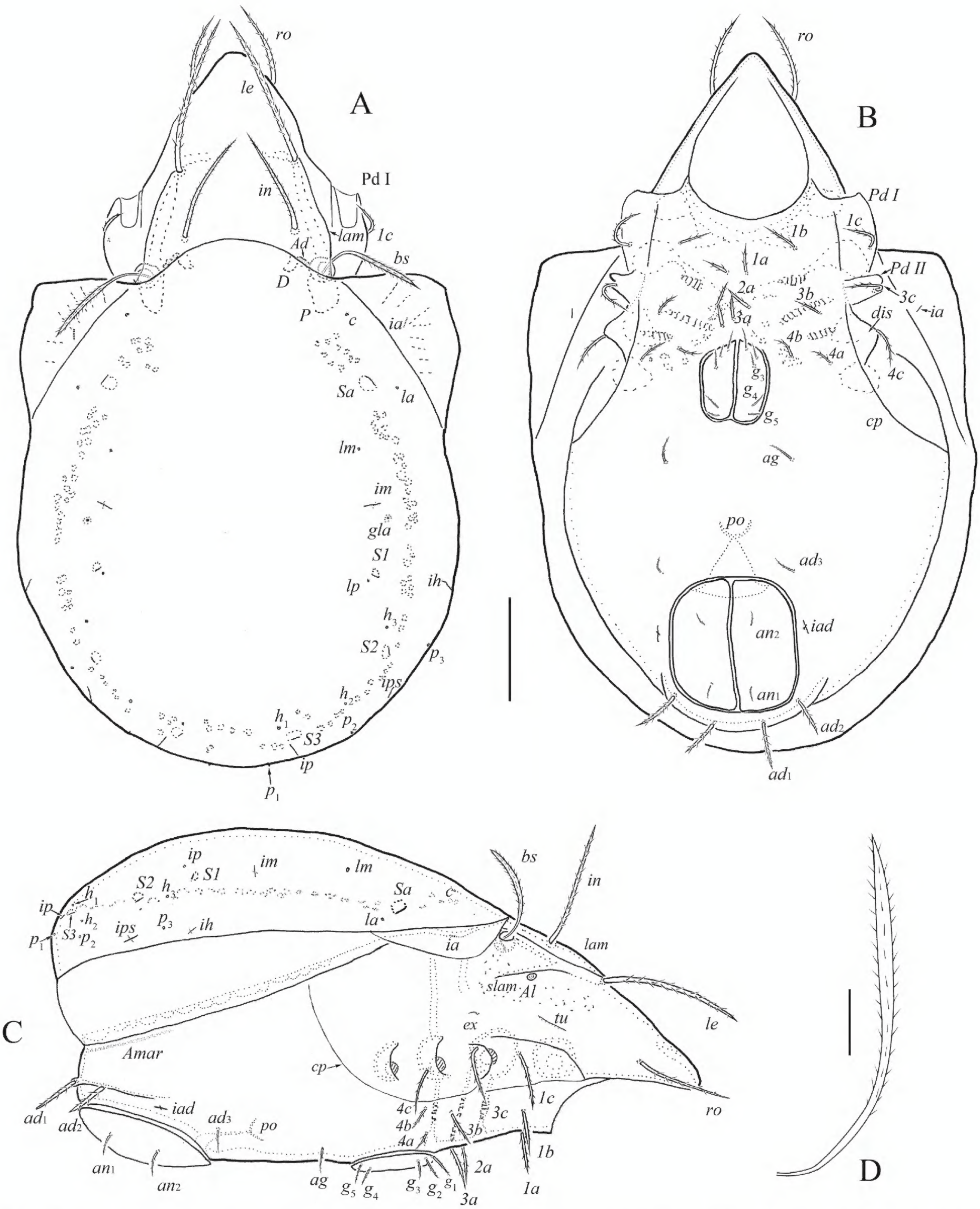

Figure 3. *Indoribates* (*Haplozetes*) *asetosus* sp. nov. **A** dorsal view (legs not shown) **B** ventral view (gnathosoma and legs not shown) **C** lateral view (gnathosoma and legs not shown) **D** bothridial seta. Scale bars: 100 µm (**A–C**); 20 µm (**D**).

(7) oval. Rostral (86–97), lamellar (138–149) and interlamellar (108–116) setae setiform, barbed. Exobothridial seta (7–9) setiform, thin, smooth. Bothridial seta (100–112) long, with shorter stalk and longer, uniformly thickened, barbed head. Sejugal porose area distinct, located posterolateral to interlamellar seta, transversely elongate.

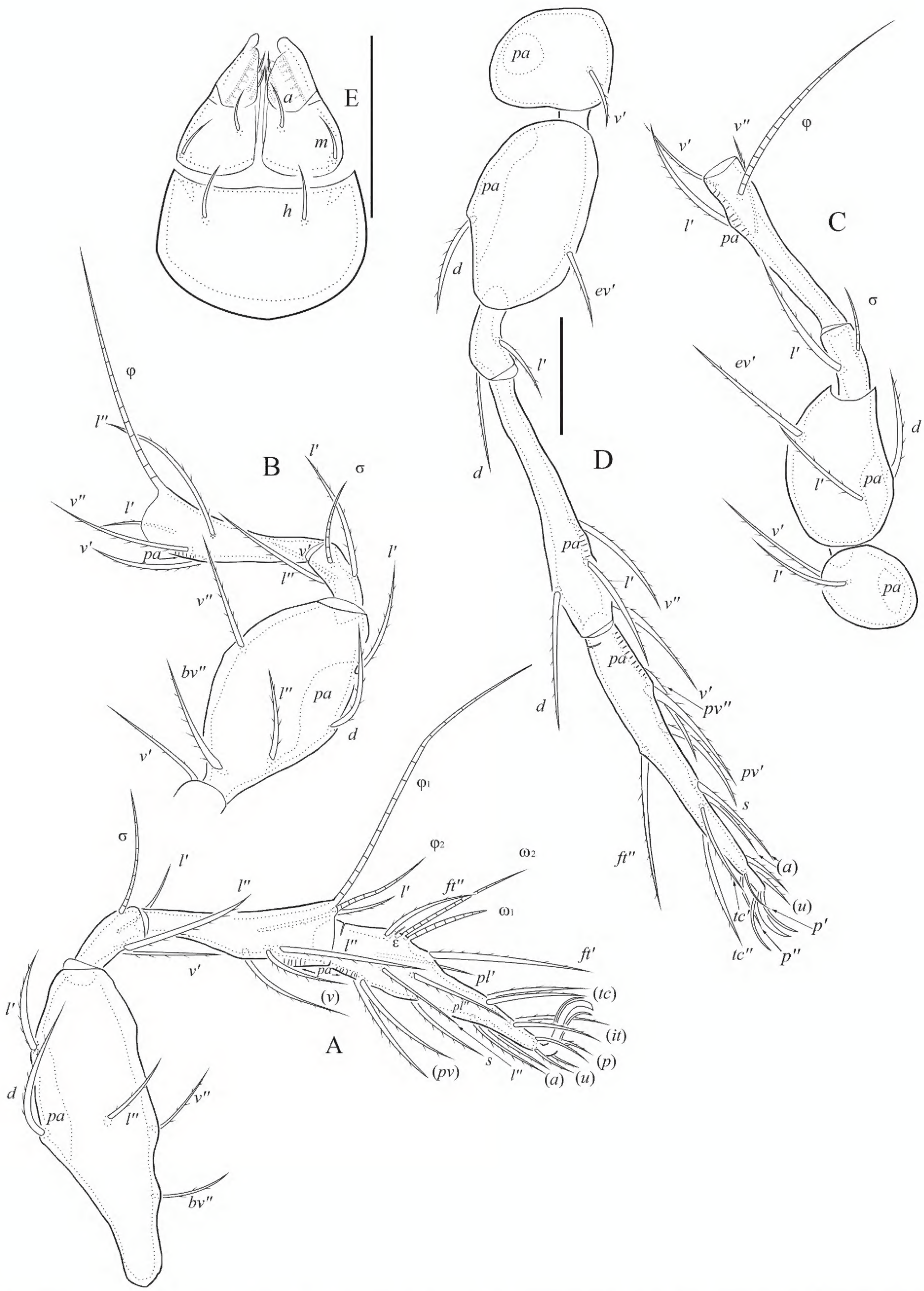

Figure 4. *Indoribates* (*Haplozetes*) *asetosus* sp. nov. **A** leg I (without trochanter), right, antiaxial view **B** leg II (without tarsi), left, antiaxial view **C** leg III (without tarsi), right, antiaxial view **D** leg IV, right, antiaxial view **E** subcapitulum, ventral view. Scale bars: 50 μm (**A–D**); 20 μm (**E**).

Notogaster (Fig. 3A, C, D). Anterior notogastral margin convex medially. Dorsophragma nearly oval. Pteromorph with distinct hinge. Ten pairs of notogastral setae represented by alveoli. Four pairs of saccules with small opening and drop-like channel. Opisthonotal gland opening and all lyrifissures distinct.

Gnathosoma (Figs 4E). Subcapitulum size: 151–159 × 105–112. All subcapitular setae (*h* 22–26, *m* 24–26, *a* 24–25) setiform, smooth. Both adoral setae (7–10) setiform, barbed. Palp (length 85–91) with setation 0-2-1-3-9(+ω). Postpalpal seta (7) spiniform, roughened. Chelicera (length 150–162) with two setiform barbed setae (*cha*: 39–44; *chb*: 25–29).

Epimeral and lateral podosomal regions (Fig. 3B, C). Epimeral setal formula: 3-1-3-3. All epimeral setae (30–56) setiform, slightly thickened, barbed. Pedotectum II trapezoid. Discidium triangular, rounded apically. Circumpedal carinae long, reaching to acetabulum II.

Anogenital region (Fig. 3B, C). Genital (15–24), aggenital (21–23) and anal (21–25) setae setiform, barbed. All adanal setae barbed, $ad_{1\text{-}2}$ (41–45) thicker, inserted on semicircular protrusion; ad_3 (21–23) setiform. Adanal lyrifissure laterally located, adjacent to anal aperture.

Legs (Fig. 4A–D). All legs tridactylous; median claw thick, lateral claws thin; all claws slightly barbed on dorsal side. Dorsoparaxial porose area on femora I–IV and on trochanters III, IV well visible. Formulas of leg setation and solenidia: I (1-5-3-4-19) [1-2-2], II (1-5-3-4-15) [1-1-2], III (2-3-1-3-15) [1-1-0], IV (1-2-2-4-12) [0-0-0]. Homology of setae and solenidia indicated in Table 2. Solenidion φ on tibia IV absent, but seta *d* developed instead it.

Etymology. The specific name *asetosus* refers to notogastral setae represented by alveoli.

Remarks. *Indoribates* (*Haplozetes*) *asetosus* sp. nov. is morphologically similar to *I.* (*H.*) *fusifer* (Berlese, 1908) (see also Akrami and Behmanesh 2013) and *I.* (*H.*) *triungulatus* (Beck, 1964) in having long bothridial seta with narrowly elongate head, but differs from *I.* (*H.*) *fusifer* by the absence of φ on tibia IV (vs presence), and the thickened adanal setae ad_1, ad_2 (vs thin). Moreover, the new species is distinguished from *I.* (*H.*) *triungulatus* by the shape of the interlamellar seta (long, barbed vs short, smooth), the length of the adanal setae $ad_{1\text{-}2}$ (long vs short) and tutorium (short vs long); and the shape of all notogastral setae (represented by alveoli vs short, setiform).

The most remarkable diagnosis of the new species is that solenidion φ on the leg tibia IV is absent, but represented by *d*. We examined the type specimens carefully and found no solenidion φ and no alveolus; there is a barbed *d* seta in the corresponding position. This feature is not typical for Haplozetidae, but it is typical for representatives of the related oripodoid family Parakalummidae.

Table 2. Leg setation and solenidia of adult *Indoribates* (*Haplozetes*) *asetosus* sp. nov.

leg	Tr	Fe	Ge	Ti	Ta
I	*v'*	*d*, (*l*), *bv"*, v"	(*l*), *v'*, σ	(*l*), (*v*), φ_1, φ_2	(*ft*), (*tc*), (*it*), (*p*), (*u*), (*a*), *s*, (*pv*), (*pl*), *l"*, ε, ω_1, ω_2
II	*v'*	*d*, (*l*), *bv"*, *v"*	(*l*), *v'*, σ	(*l*), (*v*), φ	(*ft*), (*tc*), (*it*), (*p*), (*u*), (*a*), *s*, (*pv*), ω_1, ω_2
III	*l'*, *v'*	*d*, *l'*, *ev'*	*l'*, σ	*l'*, (*v*), φ	(*ft*), (*tc*), (*it*), (*p*), (*u*), (*a*), *s*, (*pv*)
IV	*v'*	*d*, *ev'*	*d*, *l'*	*l'*, (*v*), *d*	*ft"*, (*tc*), (*p*), (*u*), (*a*), *s*, (*pv*)

Note. See Table 1 for explanation.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

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Author contributions

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Data availability

All of the data that support the findings of this study are available in the main text.

References

Akrami MA, Behmanesh M (2013) Complementary data on *Haplozetes fusifer* (Berlese, 1908) (Acari, Oribatida, Haplozetidae) collected from Iran. Graellsia 69(2): 147–152. https://doi.org/10.3989/graellsia.2013.v69.072

Balogh J, Balogh P (1992) The Oribatid Mite Genera of the world. Vol. I. Hungarian National Museum Press, Budapest, 263 pp.

Beck L (1964) Beiträge zur Kenntnis der neotropischen Oribatidenfauna 4. *Haplozetes* und *Peloribates* (Arach, Acari). Senckenbergiana Biologica 45(2): 161–183.

Bulanova-Zachvatkina EM (1960a) New representatives of primitive oribatid mites from the superfamily Perlohmannoidea Grandjean, 1958 (Acariformes). Zoological Journal 39(12): 1835–1848. [in Russian]

Bulanova-Zachvatkina EM (1960b) On the fauna of oribatid mites of the Soviet Union (Acariformes, Oribatei). Nauchnye doklady vysshei shkoly. Biologicheskie nauki, Zoologia, Moscow 4: 27–39. [in Russian]

Ermilov SG, Behan-Pelletier VM (2024) *Araguazetes luisi* gen. nov., sp. nov.(Acari, Oribatida, Haplozetidae) from Henri Pittier National Park, Venezuela. Zootaxa 5556(1): 51–61. https://doi.org/10.11646/zootaxa.5556.1.5

Ermilov SG, Subías LS, Shtanchaeva UY, Friedrich, S (2024) Taxonomic contribution to knowledge of the oribatid mite genus *Mancoribates*. Spixiana 47(1): 121–127. https://doi.org/10.11646/zootaxa.5556.1.4

Ghilarov MS, Krivolutsky DA (1975) Identification Keys to the Soil Oribatid Mites Sarcoptiformes. Nauka Press. Moscow, Russia, 490 pp. [In Russian]

Gordeeva EV (1980) Oribatid mites of the family Cosmochthoniidae (Oribatei). Zoological Journal 59(6): 838–850.

Grandjean F (1936) Observations sur les Acariens (10e Série). Bulletin du Muséum National d'Histoire Naturelle 2: 246–253.

Hammer M (1979) Investigations on the Oribatid fauna of Java. Det Kongelige Danske Videnskabernes Selskab Biologiske Skrifter 22(9): 1–79.

Ilyasov IN (1963) The fauna and distribution of armored mites in different geographical zones of Tajikistan. All-Union Symposium on Soil-forming Oribatid-mites. A.N. Severtsov Institute of Evolutionary Morphology and Ecology of Animals, Academy of Sciences of the USSR, Moscow, 12–13. [in Russian]

Ilyasov IN (1970) Dynamics of oribatid mites, the intermediate hosts of *Anoplocephalata*, parasites of farm animals in Central Tajikistan. In: Bulanova-Zakhvatkina E (Ed.) Oribatids and their Role in the Processes of Soil Formation. Vilnius Academy of Sciences, Lithuanian SSR, 235–238 pp. [in Russian]

Jacot AP (1929) Genera of Pterogasterine Oribatidae (Acarina). Transactions of the American Microscopical Society 48(4): 416–431. https://doi.org/10.2307/3222059

Karppinen E, Krivolutsky DA, Poltavskaja MP (1986) List of oribatid mites (Acarina, Oribatei) of northern Palaearctic region. III. Arid lands. Annales Entomologici Fennici. 52: 81–94.

Khristov VV (1973) Landscape distribution of oribatids in Tadzhikistan. Zoological Journal, 606–607. [in Russian]

Krivolutsky DA (1966) On the oribatid mites (Oribatei, Acariformes) of the soils of Central Asia. Zoological Journal 45: 1628–1639. [in Russian]

Krivolutsky DA (1971) Some new oribatid mites (Acariformes) from Central Asia. Journal of the Czechoslovak Zoological Society 35: 35–39.

Kunst M (1977) Die Gattung *Haplozetes* in der Tschechoslowakei (Acari: Oribatei). Vestnik Ceskoslovenske Spolecnosti Zoologicke 41: 185–194.

Mahunka S (1977) Neue und interessante Milben aus dem Genfer Museum XX. Contribution to the oribatid fauna of S.E. Asia (Acari, Oribatida). Revue Suisse de Zoologie 84(1): 247–274. https://doi.org/10.5962/bhl.part.91385

Mahunka S (1982) Oribatids from the eastern part of the Ethiopian Region (Acari). I. Acta Zoologica Academiae Scientiarum Hungaricae 28: 293–336.

Mahunka S (1997) Oribatids from Brunei II (Acari: Oribatida) (Acarologica Genavensia LXXXII). Revue suisse de Zoologie, 104 (3): 661–700. https://doi.org/10.5962/bhl.part.80015

Mahunka S (2001) Cave-dwelling oribatid mites from Greece (Acari: Oribatida) (Neue und interessante Milben aus dem Genfer Museum XLIX). Revue suisse de Zoologie 108(1): 165–188. https://doi.org/10.5962/bhl.part.79625

Niedbała W (2012) Ptyctimous mites (Acari, Oribatida) of the Palaearctic region. Systematic part. Fauna Mundi 4: 1–472. https://doi.org/10.11646/zootaxa.3664.4.9

Norton RA (1977) A review of F. Grandjean's system of leg chaetotaxy in the Oribatei (Acari) and its application to the family Damaeidae. In: Dindal DL (Ed.) Biology of Oribatid Mites. SUNY College of Environmental Science and Forestry, Syracuse, 33–61.

Norton RA, Behan-Pelletier VM (2009) Oribatida. In: Krantz GW, Walter DE (Eds) A Manual of Acarology. Texas Tech University Press, Lubbock, 430–564.

Norton RA, Ermilov SG (2024) Catalogue of juvenile instars of oribatid mites (Acari: Oribatida) –the next decade (2014–2023). Zootaxa 5419(4): 451–494. https://doi.org/10.11646/zootaxa.5419.4.1

Penttinen R, Gordeeva E (2009) Distribution of *Cosmochthonius* species (Oribatida: Cosmochthoniidae) in the eastern part of the Mediterranean, Ukraine and Tajikistan. In: Sabelis MW, Bruin J (Eds) Trends in Acarology: Proceedings of the 12th International Congress. Springer Netherlands, 171–174. https://doi.org/10.1007/978-90-481-9837-5_27

Ryabinin NA (1986) Beetle mites of the genus *Pedrocortesia* (Acariformes, Oribatei) in the fauna of the USSR. Zoological Journal 341–348. [in Russian]

Sellnick M (1925) Javanische Oribatiden. Treubia 6: 459–475.

Shtanchaeva UY (2001) Catalog of oribatid mites of the Caucasus (Acari, Oribatida). Acarina 9(2): 177–221. https://doi.org/10.11646/zootaxa.4716.1.1

Sidorchuk EA, Norton RA (2016) The identity and type specimens of *Collohmannia asiatica* (Acari, Oribatida, Collohmanniidae). Acarina 24(1): 5–16. https://doi.org/10.21684/0132-8077.2016.24.1.5.16

Sitnikova LG (1973) New species of oribatid mites of the genus *Hermanniella* Berlese, 1908 (Oribatei, Hermanniellidae) in the fauna of USSR. USSR Entomological Review 52: 953–963. [in Russian]

Subías LS (2022) Listado sistemático, sinonímico y biogeográfico de los ácaros oribátidos (Acariformes: Oribatida) del mundo (excepto fósiles). Monografías Electrónicas Sociedad Entomológica Aragonesa 12: 1–538.

Subías LS (2024) Listado sistemático, sinonímico y biogeográfico de los Ácaros Oribátidos (Acariformes: Oribatida) del mundo (excepto fósiles), 19a actualización, 1–545. http://bba.bioucm.es/cont/docs/RO_1.pdf [Accessed on: 2024-1-1]

Subías LS, Shtanchaeva UY (2023) Claves de familias, géneros y subgéneros de ácaros oribátidos del mundo (Acari, Oribatida). Monografías Electrónicas Sociedad Entomológica Aragonesa 13: 1–290.

Wei Y, Chen J (2017) Some intraspecific morphological variations of *Passalozetes* (*Passalozetes*) *africanus* Grandjean, 1932, a newly recorded species from China, with a checklist and key to known species of the genus. Systematic and Applied Acarology 22(3): 431–445. https://doi.org/10.11158/saa.22.3.9

Weigmann G (2006) Hornmilben (Oribatida). Die Tierwelt Deutschlands. Teil 76. Goecke & Evers, Keltern, 520 pp.

Willmann C (1935) IV. Die Milbenfauna. Oribatei. In: Jaus I. Faunistisch-ökologische Studien im Anningergebiet, mit besonderer Berücksichtigung der xerothermen Formen. Zoologische Jahrbücher (Systematik) 66(5): 331–344.

Xu SJ, Liu CL, Chen J (2024) Taxonomic contribution to the knowledge of the genus *Indoribates* and *Lauritzenia* (Acari, Oribatida, Haplozetidae), with description of a new species from China. Zootaxa 5556(1): 84–96. https://doi.org/10.11646/zootaxa.5556.1.8